WARNING

Because of possible shock or fire hazards, connection of this instrument should be performed in compliance with the National Electric Code (ANSI C1) or any other requirements, or both, which may be applicable to the user.

Installation, operation, and maintenance should only be performed by qualified personnel.

TM-111925-1

VOLUME 1 -- OPERATOR'S MANUAL

626-PA-6020

BROADBAND RADIO FREQUENCY (RF) MONITOR

1 September 1985
(Rev. 4/1/86)
(Rev. 9/1/89)
(Rev. B)

See opposite side relative to proprietary rights

Note: Refer to Volume 2 (Service Manual) TM-111925 for maintenance information.

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DRANETZ TECHNOLOGIES, INC.
1000 New Durham Rd.
Edison, New Jersey 08818

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IMPORTANT! CALIBRATION INTERVAL

The recommended calibration interval for this unit is once every 12 MONTHS.

We recommend that you return the unit to the factory for calibration. If you decide to do so, first contact the Dranetz Customer Service Department to obtain an authorization number.

Telephone Number:	(201) 287-3680
Telex Number:	499-7808
TWX Number:	(710) 997-9553
FAX Number:	(201) 248-9240
Cable:	DRANETZ

Then fill out the Repair/Service Order form enclosed in this manual and ship it along with the unit to the Dranetz Customer Service Department. (If this form is missing, ask the Dranetz Customer Service Department for a replacement.)

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The information in this manual has been reviewed and is believed to be entirely reliable. No responsibility, however, is assumed for any inaccuracies. The material in this manual is for information purposes only, and is subject to change without notice.

VOLUME 1
OPERATOR'S MANUAL

626-PA-6020 BROADBAND RADIO FREQUENCY (RF) MONITOR

SECTION I
GENERAL INFORMATION

1.1 SCOPE

This manual consists of two volumes. Volume 1, the Operator's manual, is divided into three sections: (I) GENERAL INFORMATION, (II) INSTALLATION AND OPERATION, and (III) OPERATIONAL TEST. Volume 2, the Service manual, contains the maintenance instructions and consists of four sections, IV through VII. (See Volume 2 for a description of these sections.)

1.2 INTRODUCTION

This manual provides the installation and operating instructions for the 626-PA-6020 Broadband Radio Frequency (RF) Monitor Plug-in Module. It will be referred to simply as the 6020 plug-in. The 6020 plug-in is designed for installation into the Series 626 Universal Disturbance Analyzer Mainframe, referred to as the Series 626 or Mainframe. Also included in this manual are the instructions for connecting and positioning the Antenna Unit which comes standard with the plug-in.

Before reading these instructions further, you should be familiar with the Mainframe information described in Volume 1 of the Mainframe manual.

1.2.1 A Brief Background on RF Interference

Computer-based electronic equipment is susceptible to radio frequency (RF) interference. Significant RF field strengths are commonly produced by hand-held walkie-talkies, broadcast activity, faulty automobile ignitions, etc. RF energy can couple into the electronic equipment through its enclosure or power line, because the enclosure and power line act like an antenna attracting radio frequencies. Once coupled with the electronic equipment, RF energy can cause it to malfunction.

1.3 APPLICATIONS

Because RF interference is broadband, random, and intermittent, it is very difficult to identify as the cause of equipment malfunction. The 6020 plug-in will identify RF interferences, classify them, and store them for immediate or later printout, or both.

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1.4 PURPOSE

The 6020 plug-in correlates excessive RF field strength with the malfunction of computer-based electronic equipment.

The plug-in uses a broadband omnidirectional antenna to monitor RF field strength at any given point. If the RF field strength exceeds the user-programmed limits for continuous wave (CW) or burst* signals, the plug-in records the RF field strength, its duration, and time (of day) of occurrence.

NOTE

For an explanation of the difference between a Burst disturbance and an RF Field Strength High Limit (CW) disturbance, refer to Appendix A.

1.4.1 General Operational Description

Time is measured by a highly accurate, crystal-controlled 24-hour clock, built into the Series 626 Mainframe.

The 6020 plug-in monitors the continuous wave average RF field strength sensitivity, the continuous wave RF field strength high limit, and the sensitivity and duration of short bursts. All of its limits are user-programmed.

Except for an automatic Summary printout which occurs each day at midnight (Series 626 time), disturbances are printed as they occur. In an alternate mode, however, a disturbance Data Summary printout will occur only at midnight, or when the Mainframe's black [DATA] push button is pressed. This feature permits long-term unattended operation of the Series 626.

1.4.2 User-Programmed Threshold Alterations

The programmable thresholds may be easily altered using the front panel keys. Cueing indicators (LEDs) adjacent to the keys simplify the programming procedure. Both the program and the disturbance data in the data accumulator may be printed upon demand.

1.4.3 "Factory Preset" Program

A copy of the factory preset program for the 6020 plug-in is stored in non-volatile memory at Dranetz Technologies, Inc. It may always be recalled upon request if your program becomes altered or destroyed.

---

* -"Bursts" are sudden increases in electrical signal strength lasting 10 milliseconds or less.

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1.5 PHYSICAL CONFIGURATION

1.5.1 6020 Plug-In Module

The 6020 plug-in is a single width module: 6½" high by 1¼" wide by 10" deep. It is designed for installation into any one of the five slots of the Series 626 Mainframe.

1.5.2 Antenna Unit

The Antenna Unit supplied with the 6020 plug-in is 4½" high by 6" wide by 6" deep, and weighs approximately 20 ounces. Attached to the Antenna Unit is a 10-foot cable with a connector on its free end. The connector gets plugged into the receptacle on the 6020 plug-in's rear panel.

1.6 TECHNICAL SPECIFICATIONS

The technical specifications for the 6020 plug-in are listed in Table 1-1 which begins below.

Table 1-1. Technical Specifications (Page 1 of 2)

FREQUENCY RANGE:	1.0 MHz to 1.0 GHz
FIELD STRENGTH RANGE	
CW:	0.5 TO 8.0 volts/meter
Burst:	1.0 to 8.0 volts/meter

NOTE

A burst is defined as less than 10 milliseconds in duration.

ACCURACY:	±1.5dB @ 100 MHz @ 6.0 volts/meter
LINEARITY:	±1.5dB from 1.0 to 8.0 volts/meter; referenced to 100 MHz and 6.0 volts/meter
FREQUENCY RESPONSE:	±6dB, 1.0 MHz to 800 MHz
POLARIZATION:	Vertical
DIRECTIVITY:	Omnidirectional
MINIMUM BURST ON TIME:	1 microsecond
BURST DURATION LOW LIMIT RANGE:	0 to 5000 microseconds (whole numbers)

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Table 1-1. Technical Specifications (Page 2 of 2)

CONTINUOUS WAVE AVERAGE RF SENSITIVITY RANGE:	0.5 to 4.0 volts/meter
CONTINUOUS WAVE RF FIELD STRENGTH HIGH LIMIT RANGE:	0.6 to 8.0 volts/meter
BURST SENSITIVITY RANGE:	1.0 to 8.0 volts/meter

NOTE

Frequency response and accuracy are based on measurements taken with the Series 626 sitting on a large ground plane. Vertical monopoles were used as the transmitting antennas.

1.7 STANDARD ACCESSORIES

Part #	Quantity	Description
TM-111925 Volume 1	1	Operator's manual
P/N 111926-G1	1	Antenna Unit with 10-foot connecting cable

1.8 OPTIONAL ACCESSORIES

Part #	Quantity	Description
TM-111925 Volume 2	1	Service (Maintenance) manual

1.9 FACTORY REPAIR

When factory repair is required, proceed as follows:

1. Contact Dranetz Customer Service Department to obtain an authorization number for factory repair:

   Telephone No: (201) 287-3680 TWX: (710) 997-9553
   FAX: (201) 248-9240 Telex: 499-7808
   Cable: DRANETZ

2. Fill out the REPAIR/SERVICE ORDER form enclosed in the Series 626 Operating manual. Ship it along with the malfunctioning equipment to the Dranetz Customer Service Department.

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SECTION II
INSTALLATION AND OPERATION

2.1 GENERAL

This section contains the installation, programming, and operating instructions for the 6020 plug-in and its Antenna Unit.

2.2 LOAD RATINGS

The Series 626 standard Mainframe has an upper limit of the combined total rating of its installed modules. The overall Mainframe capacity is set at 20 units. The individual modules (existing as of this printing) have the following load ratings:

Table 2-1. Load Ratings

Plug-in	Load Rating	Plug-in	Load Rating
626-PA-6001	2 Units	626-PA-60012A	3 Units
626-PA-6001		626-PA-6013	2 Units
with Extra		626-PA-6014	1 Unit
Option Board	3 Units	626-PA-6015	4 Units
626-PA-6002	2 Units	626-PA-6018	4 Units
626-PA-6003	4 Units	626-PA-6020	4 Units
626-PA-6005	2 Units	626-PA-6024A	4 Units
626-PA-6006	2 Units	626-PA-6024B	4 Units
626-PA-6007	1 Unit	626-PA-6025	4 Units
626-PA-6008	2 Units	626-PA-6030	6 Units
626-PA-6009	4 Units	626-PA-6037	1 Unit
626-PA-6011	1 Unit	626-PA-6038	1 Unit
626-PA-6012	2 Units	626-PA-6040	6 Units

NOTE

When selecting modules for installation into any Series 626 Mainframe, verify that the sum of the load ratings of the installed modules DOES NOT exceed 20 Units.

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2.3 INSTALLATION

To install the 6020 plug-in into the Mainframe:

WARNING

Be sure that the Series 626 Mainframe and all of the power connected to its plug-in modules are first turned OFF before proceeding with any installation.

(1) Remove the 6020 plug-in from its packaging.

(2) Position the top and bottom front corners of the plug-in module into the upper and lower tracks of the desired slot position at the rear of the Series 626 Mainframe.

(3) Carefully slide the module into the Mainframe until it is firmly in position.

(4) Tighten the top and bottom captive screws in order to secure the module to the Mainframe.

2.3.1 Connecting and Positioning the Antenna Unit

The Antenna Unit has a 10-foot cable with an attached 7-pin connector. The connector mates into the Antenna Unit socket on the rear panel of the 6020 plug-in. To connect the Antenna Unit:

(1) Insert the FUNCTION key into the FUNCTION key switch on the front panel of the Mainframe.

(2) Turn the switch to "OFF."

(3) Align the red dot on the Antenna cable connector with the red dot on the plug-in's Antenna Unit socket, and push the connector into the socket until it is firmly in position.

CAUTION

To avoid damaging the equipment, DO NOT connect anything other than the Antenna Unit to the 6020 plug-in, and vice versa.

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(4) Position the Antenna Unit within a 10-foot radius of the Mainframe's rear panel, ideally, on a horizontal conductive surface.

(5) Connect the short metalic ground strap attached to the Antenna Unit's sensor to the conductive surface (if applicable).

NOTE

The sensor built into the Antenna Unit is designed to be placed on a horizontal conductive surface. The short metalic ground strap should be connected to this conductive surface. Although this connection is not an absolute requirement, not using it will affect the RF field strength measurements.

2.4 OPERATING THE 6020 PLUG-IN

The following subsection contains information on the Series 626's operating controls and indicators used by the 6020 plug-in.

2.4.1 Operating Controls and Indicators

The Series 626 uses a menu-style format for selecting items and thresholds. The functions of the Series 626's operating controls and indicators used by the 6020 plug-in are described in Table 2-2 on the following page. Figure 2-1 on the page after illustrates these controls on a typical front panel of a Series 626 Mainframe. For a description of the controls common to overall Series 626 operation, refer to Volume 1 of the Mainframe manual.

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Table 2-2. 6020 Plug-In Operating Controls

ITEM	FUNCTION
Numerical Keyboard*	Allows the selection of menu items
Numerical Keys	Used to enter numerical values for the various functions.
[HI LIMIT] key	When pressed, enables the numerical keyboard to program the RF field strength high limit threshold.
[LO LIMIT] key	When pressed, enables the numerical keyboard to program the burst duration low limit threshold.
[SENS] key	When pressed, enables the numerical keyboard to program the average RF field strength sensitivity threshold.
[BURST SENS] key**	When pressed, enables the numerical keyboard to program the field strength burst sensitivity threshold.
[DATA] push button*	Produces a Data Summary printout when pressed.
[PRESET] push button	With the FUNCTION key switch set at "PROGRAM", and a channel push button [1], [2], [3], [4], or [5] depressed, pressing [PRESET] recalls the non-volatile "Factory Preset" program for that channel.
[ENTER] key	When pressed, transfers the entered numerical value into the 6020 plug-in's main memory.
OTHER FRONT PANEL CONTROLS AND INDICATORS	Refer to Volume 1 of the Mainframe Manual (Operator's Manual).

* -"Key" and "keyboard" represent the red, green, and yellow keys. "Push button" represents the black selector buttons.

** -If your Mainframe does not have a red key labeled "BURST SENS," it is the key directly below the red [HI LIMIT] key.

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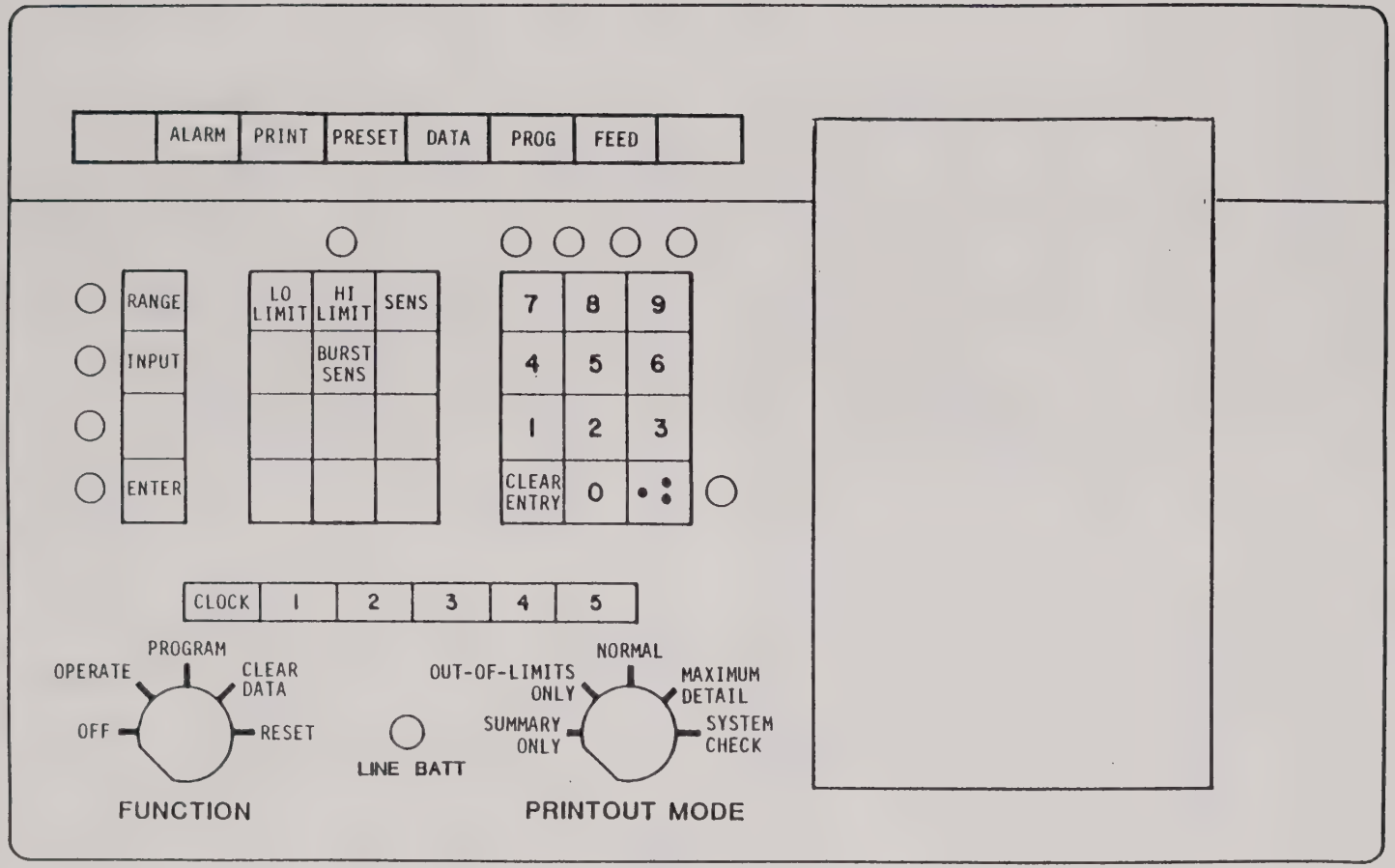

Figure 2-1. Series 626 Controls used by the 6020 Plug-in

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2.5 PROGRAMMING THE 6020 PLUG-IN

The 6020 plug-in monitors four programmable thresholds:

1) Continuous wave RF field strength high limit,

2) Continuous wave average RF field strength sensitivity,

3) Field strength burst sensitivity, and

4) Burst duration low limit.

2.5.1 Programming Procedure

NOTE

The 6020 plug-in is designed to detect an invalid entry. For Example: The burst sensitivity may be programmed in the range of 1.0 to 8.0 volts/meter. If you try to program a burst sensitivity 9.0 volts/meter, the Series 626 will print the message "ENTRY TOO HIGH." You must then reprogram an acceptable value.

(1) Turn on the Series 626 by turning the FUNCTION key from "OFF" to "OPERATE." To begin programming, turn the FUNCTION key from "OPERATE" to "PROGRAM."

a. A Program Summary for the currently selected channel will be immediately printed.*

(2) Press the channel push button (one through five) corresponding to the slot position of the 6020 plug-in.

NOTE

The "Factory Preset" program may be recalled at any time during the PROGRAM MODE. (Refer to subsection 2.6 for more information on the PRESET function.)

a. The red LED above the center bank of keys lights and the Program Summary is printed. An example of a typical Program Summary is (top of next page):

* -If the selected channel is empty, the message "CHANNEL EMPTY" will be printed.

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626

```
LOW LIMIT  0150 US
BURST DURATION
BRST SENS  2.5 V/M
RF SENS    0.5 V/M
RF HI LIM  4.0 V/M
   626-PA-6020
       CH 4

07/15/85  10:18:05
 PROGRAM SUMMARY
```

626A,G,R,ARA

```
PROGRAM SUMMARY
07/15/85  10:18:05

       CH 4
   626-PA-6020
RF HI LIM  4.0 V/M
RF SENS    0.5 V/M
BRST SENS  2.5 V/M
BURST DURATION
LOW LIMIT  0150 US
```

The above printout indicates the time and date of the Program Summary, the channel the plug-in is in, the continuous wave RF field strength high limit threshold, the continuous wave RF field strength sensitivity threshold, the field strength burst sensitivity threshold, and the burst duration low limit threshold.

2.5.1.1 Programming the RF Field Strength High Limit Threshold

The RF field strength high limit is the maximum continuous wave (CW) value that the 6020 plug-in will allow before producing a high limit disturbance printout.

a. The red LED above the center bank of keys should be lit.

(1) Press the red [HI LIMIT] key.*

a. The red LED goes out and one yellow LED above the numerical keyboard lights.

(2) Press the numerical keys corresponding to your desired RF field strength high limit. (The decimal point after the first digit, and one digit after the decimal point is required.)

a. For Example: If your desired high limit is 4.0 volts/meter, press [4], [•:], [0].

b. The green LED next to the [ENTER] key lights.

---

* -Numbers and letters shown in brackets "[]" in this manual stand for the individual red, green, and yellow keys.

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(3) Press [ENTER].*

a. The entered value is printed.

b. The red LED lights.

2.5.1.2 Programming the Average RF Sensitivity Threshold

The average RF sensitivity threshold is the allowable continuous wave (CW) deviation from a latest recorded field strength reading. A detected increase or decrease in the field strength, greater than the average sensitivity, results in a disturbance printout.

a. The red LED above the center bank of keys should be lit.

(1) Press the red [SENS] key.

a. The red LED goes out and one yellow LED over the numerical keyboard lights.

(2) Press the numerical keys corresponding to your desired average RF sensitivity threshold. (The decimal point after the first digit, and one digit after the decimal point is required.)

a. For Example: If your desired average RF sensitivity is 1.0 volts/meter, press [1], [·:], [0].

b. The green LED next to the [ENTER] key lights.

(3) Press [ENTER].

a. The entered value is printed.

b. The red LED lights.

2.5.1.3 Programming the Burst Sensitivity Threshold

The burst sensitivity is the absolute threshold for the field strength amplitude, above which a disturbance printout is produced.

a. The red LED above the center bank of keys should be lit.

---

* -Pressing [CLEAR ENTRY] before [ENTER] will clear the current sequence of numerical keys which have been pressed.

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(1) Press the red [BURST SENS] key.

NOTE

If your Series 626 Mainframe does not have a red key labeled [BURST SENS], it is the key directly below the red [HI LIMIT] key.

a. The red LED goes out and one yellow LED over the numerical keyboard lights.

(2) Press the numerical keys corresponding to your desired burst sensitivity. (The decimal point after the first digit, and one digit after the decimal point is required.)

a. For Example: If your desired burst sensitivity is 3.5 volts/meter, press [3], [·:], [5].

b. The green LED next to the [ENTER] key lights.

(3) Press [ENTER].

a. The entered value is printed.

b. The red LED lights.

2.5.1.4 Programming the Burst Duration Low Limit Threshold

The burst duration low limit threshold is the minimum time that a burst must last before being recognized as a disturbance by the 6020 plug-in, and printed by the Series 626.

a. The red LED above the center bank of keys should be lit.

(1) Press the red [LO LIMIT] key.

a. The red LED goes out and one yellow LED over the numerical keyboard lights.

(2) Press the numerical keys (including leading zeroes) corresponding to your desired burst duration low limit threshold.

a. For Example: If your desired burst duration low limit threshold is 50 uS, press [0], [0], [5], [0].

(3) Press [ENTER].

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a. The entered value is printed.

b. The red LED lights.

2.5.1.5 Completion of the Programming

When the 6020 plug-in's programming is completed, you may program another module, by pressing another channel push button, or place the Series 626 on-line by turning the FUNCTION key to "OPERATE." While on-line, you may print the plug-in's current Program Summary by simply pressing the black [PROG] push button (while the proper channel push button is depressed).

2.6 SELECTING THE "FACTORY PRESET" PROGRAM

To select the "Factory Preset" program, proceed as follows:

(1) Turn the FUNCTION key to "PROGRAM."

a. A Program Summary for the currently selected channel is immediately printed.* If the 6020 plug-in is in this channel, go to step (3).

(2) Press the channel push button (one through five) corresponding to the slot position of the 6020 plug-in.

a. The channel's Program Summary is immediately printed.

(3) Press the black [PRESET] push button.

a. The "Factory Preset" program is recalled from memory.

b. A new Program Summary indicating the "Factory Preset" values is printed. An example of this printout is:

626

```
LOW LIMIT  0100 US
BURST DURATION
BRST SENS  2.0 V/M
RF SENS    1.0 V/M
RF HI LIM  3.0 V/M
   626-PA-6020
       CH 4

07/15/85  10:44:30
 PROGRAM SUMMARY
```

626A,G,R,ARA

```
 PROGRAM SUMMARY
07/15/85  10:44:30

       CH 4
   626-PA-6020
RF HI LIM  3.0 V/M
RF SENS    1.0 V/M
BRST SENS  2.0 V/M
BURST DURATION
LOW LIMIT  0100 US
```

* -If the selected channel is empty, the message "CHANNEL EMPTY" is printed.

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2.7 POSSIBLE DISTURBANCE PRINTOUTS

Whenever a disturbance is detected by the 6020 plug-in, it is immediately classified and stored or printed by the Series 626. The following subsections contain the possible disturbance printouts.

2.7.1 RF Field Strength High Limit Disturbance Printout

Whenever the monitored continuous wave electrical field exceeds the programmed upper limit, a disturbance message is printed. An example of the printed message is:

```
4 HIGH 12:34:14.78
```

In the above printout, "4" is the channel number, "HIGH" represents the category of disturbance (RF field strength high limit), and time is given in hours, minutes, and seconds (accurate to the .01 second).

When the monitored continuous wave electrical field returns to within "normal" limits, a message such as the following is printed:

626

```
4 NORM 12:34:14.80
4.7 V/M MAX
```

626A,G,R,ARA

```
4.7 V/M MAX
4 NORM 12:34:14.80
```

The above printout indicates that the electrical field returned to "normal" (within programmed limits) at the time indicated. It also indicates the maximum RF field strength achieved: 4.7 volts/meter.

2.7.2 RF Field Strength Deviation Printout

An RF field strength deviation printout occurs whenever the monitored continuous wave electrical field deviates by more than the programmed average RF sensitivity from the latest recorded reading. Below is an example of two RF field strength deviation printouts. In the top printout, the electrical field increased to 5.4 volts/meter at the time shown; in the second, the field decreased to 4.3 volts/meter at the time shown.

626

```
4 INC  01:02:34.56
   5.4 V/M

4 DEC  01:02:34.63
   4.3 V/M
```

626A,G,R,ARA

```
   5.4 V/M
4 INC 01:02:34.56

   4.3 V/M
4 DEC 01:02:34.63
```

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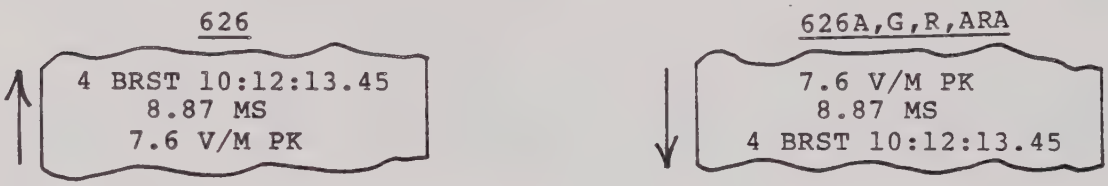
2.7.3 "Burst" Disturbance Printout

"Burst" disturbances are any electrical fields present for a short period of time (1 microsecond to 10 milliseconds). An example of a burst disturbance printout is:

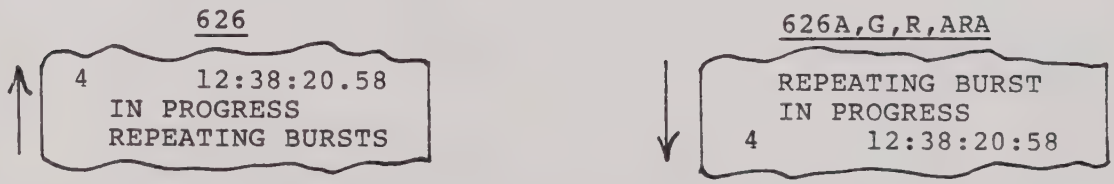


The above printout indicates that a burst of electrical field with a peak magnitude of 7.6 volts/meter and lasting 8.87 milliseconds occurred at the time shown.

2.7.4 Repeating "Bursts" Disturbance Printout

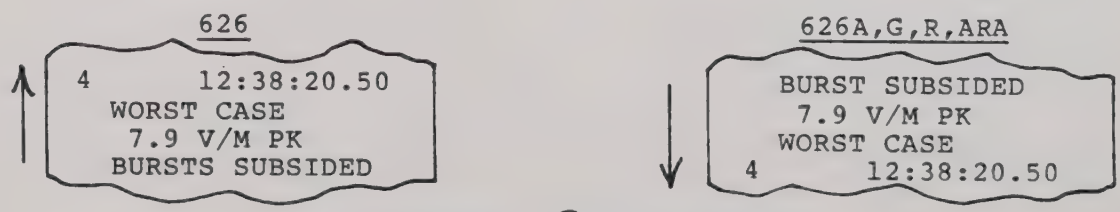
Although bursts usually occur at random, there are times when they are cyclical in nature. For Example: A switching power supply creates a burst of energy every time it switches. If the field levels produced by the switchings are high enough, a disturbance printout will occur during each 20-millisecond monitoring period.

Such a case would cause excessive use of the thermal paper, and is thus unsuitable for long-term monitoring periods. To remedy this problem, a message is printed whenever bursts are recorded in more than four successive 20-millisecond monitoring periods. An example of such a message is:



The above printout indicates the channel number and time of the repeating bursts.

The 6020 plug-in will continue to transparently monitor all of the bursts until it has detected that they have stopped for at least two seconds. A message will then be printed indicating that the bursts have subsided, and the most severe burst detected during the transparent monitoring. An example of such a printout is:



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On some occasions, the paper tape display may have just recently been torn off in order to analyze the data. If this is the case, and you would like to check if the unit is operating in the REPEATING BURSTS MODE, simply press the black [DATA] push button. A Data Summary printout will occur. If the unit is operating in the REPEATING BURSTS MODE, a "BRST REPETITIVE" message will be printed in the Data Summary.

2.8 VARIOUS PRINTOUT MODES

The setting of the PRINTOUT MODE key switch on the front panel of the Series 626 Mainframe determines the amount of detail which is printed from any disturbance. The farther counter-clockwise the key is turned, up to the SYSTEM CHECK position, the less detail is printed regarding a disturbance. Below is a list of the four key switch positions, and the amount of detail printed when the PRINTOUT MODE key is in each position.

SUMMARY ONLY

The Series 626 printer is inhibited. All data acquired by the 6020 plug-in is stored in the Series 626's daily accumulator. The daily summary is then printed at midnight (Series 626 time), or when the black [DATA] push button is pressed.

OUT-OF-LIMITS-ONLY

Disturbance data is ONLY printed when the disturbance is recorded as out-of-limits (the averaged sensitivity deviations such as increases and decreases are not printed).

NORMAL

A moderately detailed printout of any disturbances recorded by the 6020 plug-in is printed.

MAXIMUM DETAIL

A highly detailed printout of any disturbances recorded by the plug-in is printed.

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SECTION III
OPERATIONAL TEST

3.1 GENERAL

This section describes the procedure used for verifying the 6020 plug-in's operation.

3.2 PURPOSE OF THE SYSTEM CHECK

When the SYSTEM CHECK is performed, a source of signals is applied to the plug-in's Antenna Unit circuitry. These signals fully verify the plug-in's operational integrity. The signals and their allowable tolerance levels are described in subsection 3.3.1. During a SYSTEM CHECK, the Antenna Unit will still be connected and continues to monitor the electrical field. Any electrical field present when the SYSTEM CHECK is performed adds to the SYSTEM CHECK signal.

3.3 PERFORMING THE SYSTEM CHECK

To perform the SYSTEM CHECK routine:

(1) Turn the FUNCTION key to "OPERATE."

(2) Turn the PRINTOUT MODE key momentarily to "SYSTEM CHECK," and then back to "NORMAL."

NOTE

On some older models of the Series 626's front panel, "SYSTEM CHECK" may instead read "CALIBRATE."

SYSTEM CHECK Printouts within Tolerances

If the numerical values printed during the SYSTEM CHECK are within the tolerances of subsection 3.3.1, the 6020 plug-in is operating properly.

SYSTEM CHECK Printouts below Low Limit Tolerances

If either numerical value printed during the SYSTEM CHECK is below its low limit tolerance (2.5 V/M for Burst and Present RF), the plug-in is defective. In this case, contact the Dranetz Service Corp. for further instructions (refer to subsection 1.9).

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SYSTEM CHECK Printouts above High Limit Tolerances

If either numerical value printed during the SYSTEM CHECK is above its high limit tolerance (5.0 V/M for burst and 4.5 V/M for Present RF), perform the following:

(a) Press the black [DATA] push button in order to obtain a Data Summary printout.

(b) Compare the Present RF shown in the Data Summary to the out-of-tolerance Present RF shown in the SYSTEM CHECK.

--If the Present RF of the Data Summary is greater than 1.0 V/M, the plug-in is most likely operating properly. (The out-of-tolerance Present RF is being caused by excessive ambient, and the out-of-tolerance Burst is being caused by a burst signal in the vacinity adding to the SYSTEM CHECK signals.) To further verify, however, re-try the SYSTEM CHECK, or, if possible, move the plug-in to an area of less ambient and free of burst signals, and then re-try the SYSTEM CHECK.

--If the Present RF of the Data Summary is less than 1.0 V/M, the unit may be operating improperly and you should contact the Dranetz Customer Service Department for further instructions (refer to subsection 1.9).

3.3.1 System Check Signals and Tolerances

Signals	Tolerances
Burst: 3.5 V/M	Burst: 2.5 to 5.0 V/M
Present RF: 3.5 V/M	Present RF: 2.5 to 4.5 V/M

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APPENDIX A

A.1 DIFFERENCE BETWEEN A BURST DISTURBANCE AND AN RF FIELD STRENGTH HIGH LIMIT (CW) DISTURBANCE

In general, an RF field strength high limit disturbance occurs whenever the maximum continuous wave (CW) value that the 6020 plug-in is programmed for is exceeded. A burst disturbance occurs whenever the programmed absolute threshold for the field strength amplitude is exceeded.

6020 Plug-in's Signal Processing Techniques

The RF voltage measured at the plug-in's antenna is fed to its envelope detector. The envelope detector removes the high frequency components and sends a dc-to-1MHz signal back to the plug-in. The signal is then simultaneously measured by a peak detector and an integrator. The peak detector holds the peak value of the electric field long enough to be recorded as a Burst disturbance by the Mainframe. Duration and peak amplitude are recorded within the event description. The integrator is used to average the electric field strength over a 20 millisecond interval. The integrator output is read every 20 milliseconds by the Mainframe, and compared with the programmed High Limit to determine if a High Limit (CW) disturbance has occured.

Examples

The following two examples clarify the relationship between the peak detector (Burst disturbance) and the integrator (High Limit disturbance). (Assume a programmed Burst threshold of 3.9 V/M, and a High Limit of 0.7 V/M.)

Ex. (1) If a burst occurs with RF field strength peak amplitude of 6 volts/meter, duration of 1000 microseconds, and a "square" envelope, the peak detector would report a Burst with an amplitude of 6.0 V/M (>3.9 V/M threshold), and a duration of 1000 uSec. The integrator would then average this Burst over 20 milliseconds and report an average of:

$$A = \text{Avg Field Strength}$$

$$= \frac{(\text{amplitude}) \times (\text{duration})}{(20\ \text{mSec})}$$

Comment: bh is the area of a square env.

$$= \frac{(6.0\ \text{V/M}) \times (1000\ \text{uSec})}{(20\ \text{mSec})}$$

$$= 0.3\ \text{V/M}$$

Because the integrator's output of 0.3 V/M is less than the programmed High Limit (0.7 V/M), no High Limit disturbance is reported, although the Burst disturbance was recorded.

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Ex. (2) If a burst occurs with RF field strength peak amplitude of 4 volts/meter, duration of 8000 microseconds, and a "triangular" envelope, the peak detector would report a Burst with an amplitude of 4.0 V/M and a duration of 8000 uSec. The integrator would then average this Burst over 20 milliseconds and report an average of:

A = Avg Field Strength

$$= \frac{(0.5) \times (\text{amplitude}) \times (\text{duration})}{(20\ \text{mSec})}$$

Comment: ½bh is the area of a triangle env.

$$= \frac{(0.5) \times (4.0\ \text{V/M}) \times (8000\ \text{uSec})}{(20\ \text{mSec})}$$

$$= 0.8\ \text{V/M}$$

Because the integrator's output of 0.8 V/M exceeds the programmed High Limit (0.7 V/M), a High Limit disturbance is reported (in addition to the reported Burst disturbance), accompanied by the limit crossing times.

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